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ABSTRACT

This paper measures the effects on student outcomes of decentralizing educational responsibility to communities and schools. In El Salvador, community-managed schools emerged during the 1980s when public schools could not be extended to rural areas because of the country's civil war. In 1991, El Salvador's Ministry of Education decided to draw on this prototype to expand preprimary and primary education in rural areas through the EDUCO program (Educacion con Participacion de la Comunidad). The present EDUCO schools are each managed autonomously by a community education association elected from among the parents of students. The associations take a central role in administration and management. They are also responsible for contracting teachers and maintaining schools. Drawing on a national survey of schools, 38 EDUCO schools and 154 traditional rural schools were compared for third-graders' achievement on standardized tests of mathematics, language and school days missed due to teacher absence. Analysis controlled for student characteristics and selection bias, using an exogenously-determined formula for targeting EDUCO schools as an instrumental variable. Findings indicate that the rapid expansion of rural schools through EDUCO has not adversely affected student achievement yet has diminished student absences due to teacher absences. It was concluded however that this expansion may have effects on achievement long-term. (Contains 20 references and extensive statistical data tables.) (Author/SV)

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Impact Evaluation of Education Reforms

Paper No. 8

Do Community-Managed Schools Work?

An Evaluation of El Salvador's EDUCO Program

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Do Community-Managed Schools Work?

An Evaluation of El Salvador's EDUCO Program

Abstract

This paper measures the effects of decentralizing educational responsibility to communities and schools on student outcomes. Using the example of El Salvador's Community-Managed Schools Program (or, EDUCO, from the Spanish acronym, Educacion con Participacion de la Comunidad), which was designed to expand rural education rapidly following a civil war, it compares student achievement on standardized tests and school attendance of rural students in EDUCO schools versus those who are in traditional schools. It controls for student characteristics and selection bias, using an exogenously-determined formula for targeting EDUCO schools as an instrumental variable. It finds that the rapid expansion of rural schools through EDUCO (a) has not adversely affected student achievement; and (b) has diminished student absences due to teacher-absences, which may have longer-term effects on achievement.

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1 Introduction

Central governments in developing countries usually play a major role in the allocation of educational resources. Even when authority is delegated to subnational levels such as provinces or municipalities, individual school administrators and parents play only a limited role. Such a centralized structure might make it easier to regulate and administer large systems uniformly; but it may also lead to ineffectiveness and high cost when school needs differ widely across communities and when there are diseconomies of scale. Moreover, it can stifle initiative among those who are most critical in affecting school outcomes -- teachers, principals and parents.

Despite the compelling reasoning, there is relatively little empirical evidence in developing countries to document the merits of school-based management.[1] The main reason is that these administrative arrangements have only recently begun to be implemented (World Bank 1996a). One celebrated example is El Salvador's Community-Managed Schools Program (more popularly known by the acronym, EDUCO, or *Educacion con Participacion de la Comunidad*), which is an innovative program for both pre-primary and primary education to decentralize education by strengthening direct involvement and participation of parents and community groups.

A prototype of the today's EDUCO schools emerged in the 1980s when public schools could not be extended to rural areas because of the country's civil war. Some communities took the initiative to organize their own schools, administered and financially supported by an association of households. While these early attempts were constrained by the low rural income base, they demonstrated a strong inherent demand for education, as well as a desire to participate in the governance of schools. In 1991, El Salvador's Ministry of Education (MINED), supported by aid agencies such as the World Bank, decided to use the prototype as the principal method of expanding education in rural areas through the EDUCO program.

[1] Two exceptions are James, King and Suryadi (1996) for Indonesia and Jimenez and Paqueo (1996) for the Philippines. Both studies conclude that there are efficiency gains from community-based involvement.

The present EDUCO schools are managed autonomously by an elected Community Education Association (Asociacion Comunal para la Educacion or ACE) drawn from the parents of the students. In EDUCO schools, ACEs take a central role of administration and management; ACEs are contracted by MINED to deliver a given curriculum to an agreed number of students. The ACEs are then responsible for contracting and removing teachers by closely monitoring teacher's performance, and for equipping and maintaining the schools. The partnership between MINED and ACEs is expected to improve school administration and management by reflecting local demand needs more appropriately. In the future, MINED intends to introduce community management into all traditional schools.

The EDUCO program was conceived as a way to expand educational access quickly to remote rural areas. Initial evidence would indicate that it has accomplished this (El Salvador, MINED 1995). The question is whether this expansion has come at the expense of learning. But, as mentioned above, moving away from traditional programs that provide education centrally could also improve outcomes through increased community and parent involvement.

This paper assesses the EDUCO experience. It estimates school production functions using three measures of educational outcomes among third-grade students.[2] Two of these measure achievement through standardized tests in mathematics and language. While these measures may be good indicators of educational outcome, they may also be relatively unresponsive in the short-run to changes in school governance. We thus also analyze an indicator that can be considered more of an "intervening" variable in determining student achievement but would more likely exhibit a short-run response -- school-days missed by a student due to teacher absence.

As with all comparisons of educational achievement, the key is to quantify how much of the differential in academic achievement can be explained by differences in household

[2]This is part of a larger effort by the World Bank to distill the lessons of decentralized education (see World Bank 1996a). Eventually, we seek to answer whether students in EDUCO achieve higher educational outcomes and at comparable costs relative to their counterparts in traditional public schools. This particular paper has a more limited objective in using school production functions to compare three measures of educational outcomes among third grade students.

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background, the school's quantitative inputs and, most importantly, organizational factors attributable to intangible differences in the way that traditional and decentralized schools are run.[3] We also address parents' endogenous school choice by explicitly considering how the government chose which areas would first have EDUCO's schools.

The rest of this paper is organized as follows. Section 2 presents the production function model with endogenous selection and the empirical framework for estimating that model. Section 3 discusses the data, including the sample design. Sections 4 and 5 discuss the results of the student achievement and teacher absence results respectively. Section 6 concludes with a discussion of policy implications.

2 Conceptual and Empirical Framework

The Basic Model. The production of educational outcomes is a complex interaction of the behaviors of various agents who participate in the schooling process. Students' characteristics and motivation are key, but so also are the actions of individual parents, groups of parents (such as parent-teacher associations, PTAs), teachers and administrators at various levels, from the school up to the education ministry. In addition, agents not directly connected to the educational system may affect these outcomes if they influence the environment in which students learn. For example, decisions about road infrastructure in a locality may affect access to certain types of schools; or, the provision of electricity in a municipality could affect the ability of students to study at night.

It would be intractable to model the structural relationships that capture the behavior of all the relevant agents. Instead, we postulate a simple reduced form model of educational outcomes (Y). Most studies measure output by students' achievement scores, school attendance rates, repetition rates, school continuation or dropout rates. These variables are thought to capture prospects of future earnings in the labor market. In this paper, we focus on student scores in standardized achievement tests (S).

[3] For a good review of these intangibles, see Levin (1997).

Education production function studies have had a mixed record in explaining S (for a review, see Hanushek 1995). Aside from measurement and estimation issues, it may take time for a policy change such as decentralization to manifest itself in school performance, which tends to be a cumulative measure. We thus also consider an important intervening variable which eventually influences student outcomes -- student absence from school (A). Students must show up to get anything out of school. At the same time, we also want to distinguish between absences due to illness, which we do not expect to vary with decentralization, and absences due to teacher absences, which is affected by school governance. Teacher absence is an issue, not only in El Salvador:

> Lack of motivation and professional commitment produce poor attendance and unprofessional attitudes towards students. Teacher absenteeism and tardiness are prevalent in many developing countries...;absenteeism is especially acute in rural areas. Students obviously cannot learn from a teacher who is not present, and absenteeism among teachers encourages similar behavior a among students. In some countries, ... parents react to high rates of teacher absenteeism by refusing to enroll their children in school. (Lockheed et al. 1991, p. 101).

We would expect that, in a decentralized school, parental involvement would mitigate such behavior.

We assume that the components of Y = [S A] can be independently estimated. While A will likely affect S, we assume an implicit recursive process S = S(A) in which the residuals from the different equations are independent of each other and the matrix of coefficients of endogenous variables is triangular. Each structural equation can thus be estimated by OLS. We are currently exploring the possibility of joint determination.

For the ith student then, one simple model is:

(1a) $$Y_i = f(X_i, C_i, D_i)$$

where X is a vector of student and household characteristics, C is a vector of community variables, and D is the type of school attended by the student, in this case whether it is a decentralized EDUCO school or not. In this model, the latter is assumed to determine most of the school characteristics which affect student outcome. This is the ultimate reduced form -- it

assumes that the effects on achievement of a school's observed school characteristics, such as class size, teacher characteristics, etc., are fully determined by its management structure (i.e., whether it is EDUCO or not) and the characteristics of the students and their parents who fully participate in the decision-making in the school.

The effects of management structure can often be observed through differences in school inputs, such as teacher-pupil ratios, teacher remuneration or the educational background of teachers and administrators. But even if we were to enter as many school characteristics as we could observe in equation (1a), school type may still be significant because it captures unobserved managerial inputs (Levin 1997). Indeed, in reviewing 96 studies on the effects of five educational inputs on student performance in developing countries, Hanushek (1995) concluded that there are not clear and robust technical relationships between key school inputs and student performance.[4] This implies that differences in resources proxied by these production function studies might not be important determinants of school outputs, and schools in developing continue are paying for things that have little consistent or systematic payoff in terms of student performance. If so, unobserved managerial inputs may be critical in determining outcomes. Accordingly, we also postulate an alternative model:

(1b) $$Y_i = f(X_i, C_i, D_i, Z)$$

where Z represents a vector of observed school-level characteristics. Since Z will vary by school rather than by student, (1b) really expresses achievement for the ith student in a particular school. We should add a school subscript in (1b) but to simplify notation, we drop this.

Finally, it is possible that the effect of school characteristics on outcomes may vary by school type, implying that interactions terms between the components of Z and D may be relevant:

(1c) $$Y_i = f(X_i, C_i, D_i, Z, D_iZ).$$

[4] Some evidence in Hanusek (1995), however, suggests that minimal level of basic school resoures such as the availability of text books and the provision of minimal facilities are important in student achevement.

Empirical Specification. By linearizing and adding a stochastic term, which represents a well-behaved measurement error term, to equation (1a), we have a simple regression formula as follows:

$$Y_i = X_i\beta + C_i\gamma + D_i \propto + u_i \qquad (2)$$

D takes a value of 1 if the ith student is in a decentralized EDUCO school and 0 otherwise, that is, if the student attends a traditional centralized rural school (T).[5] By assumption, $E(u_i)=0$ and $Var(u_i)=\sigma_u^2$. We add school characteristics and the relevant interaction terms to correspond to the empirical versions of (1b) and (1c).

Observed household and student characteristics reflect the ability of parents to provide an adequate and supporting environment for the students. If capital markets are perfect, then life-cycle consumption and human capital investments can be determined independently. Parents would simply borrow to finance needed home inputs to maximize learning outcomes. But since credit markets are far from perfect in El Salvador, the economic circumstances of the household would be important. In this paper, we use asset variables to control for these economic effects (home ownership, the availability of electricity, sanitary services and piped water) which are hypothesized to be positively correlated with outcomes. In addition, parents' education may also reflect standards of living, as well as affecting preferences for education directly. We hypothesize that education is positively correlated with outcomes.

We cannot measure student ability directly. However, student-level effects which may be important include gender, which may reflect differential parental or teacher inputs between boys or girls, the child's age (while older students are more mature and are more likely to score higher, they may also be self-selected as underachievers left behind by their cohort), and the number of siblings (the greater the number, the less time parents would have to devote to any one of them).

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[5] Because some EDUCO programs rented space from the latter, there are a small number of students who attend classes in "mixed" schools. They are students either in EDUCO or non-EDUCO classes located in traditional schools. We do not distinguish among these in this study.

The community characteristics are proxied by department-level dummy variables. Departments are the next lower administrative division in the country after the national level. There are substantial variances in the distribution of resources across these units.

Selection. A key estimation issue may be endogenous selection. This arises because households choose which school type their children go to (conditional on having chosen to go to school, since we do not have information on children not in school).[6] If this selection is systematically based on unobserved characteristics that may also influence achievement, then the estimated effect of EDUCO through OLS regressions would be biased.

The direction of the bias is ambiguous. If the important unobserved characteristics are student motivation to learn and parent commitment to education, and these variables are positively correlated with EDUCO participation, then comparing outcomes, even after holding constant for observed characteristics, would overestimate the EDUCO effect. This effect may be mitigated by the fact that economically disadvantaged communities are targeted as priorities for the introduction of EDUCO programs. The government gives priority to those municipalities which are considered "neediest," according to a classification system developed by MINED and the Ministry of Health (MOH).[7] The key variables in the targeting system are the incidence of severe malnutrition and current access to social services.

To take these selection effects into account, we employ a Heckman two-stage procedure in which we specify a selection model that provides us with the parameters we need to correct

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To ensure the robustness of our results, we also estimated all the results for "pure" schools only; these results are available from the authors. They are not substantively different.

[6] While EDUCO sections were targeted to those areas where primary school coverage was limited, parents still would have had a choice whether or not to attend: they could have had their children commute, albeit over long distances (child fosterage for schooling is not uncommon in developing countries; see Ainsworth 1992 and Glewwe and Jacoby 1994); or they could have changed residences (Salvadorean migration rates are high). Unfortunately, the school-based nature of the sample precluded including non-attendance as an option.

[7] Uneven access to social services by municipalities has always been serious issue in El Salvador, although poverty is more widespread in the smaller municipalities. These small municipalities usually suffer from lack of financial and institutional capacity to administer and manage social services. The EDUCO program was developed in 78 of the country's poorest municipalities. It started in 1991 with six ACEs in three departments; by the end of 1992, the program had extended to all 14 departments.

equation (2).[8] We assume that governments first select which municipalities are on the priority list to receive an EDUCO program. Households then use that information in judging the relative merits of one program versus another.

We assume that households choose the type of school which maximizes their lifetime indirect utility, V. This, in turn, will depend on the benefits and costs of EDUCO versus other types of schools. The benefits of choosing EDUCO depend on household perceptions of the virtues of a decentralized program. These preferences are largely unobserved but they are presumed to be largely determined by measurable household characteristics, X.

The cost of entering an EDUCO program relative to a traditional one depends on direct costs such as tuition payments, books, and other fees.[9] These costs are largely the same for decentralized EDUCO and traditional rural programs for the most important components of cost -- all schools and books are free in grades 1 to 6. There are differences in the other direct costs. EDUCO students pay no registration fee (a "matricula"), do not buy uniforms, and receive a basic package of school supplies ("canasta basica"), such as pencils, rulers, markers, etc. Traditional rural students must incur all of these costs. On the other hand, EDUCO parents must provide a substantial amount of time by providing school meals, building and maintaining the school and administering it. We do not have direct observations on the magnitudes of these costs -- we assume in this version that these cost differentials are roughly offsetting for the decentralized and traditional schools. We plan to verify this with data from surveys which will be fielded in 1998.

The principal cost differential between EDUCO and traditional schools has to do with access, because of the relative paucity of schools in rural areas. We do not have information regarding the schooling options confronted by households (such as the distance from the house to feasible EDUCO or traditional schools) because the data are school-based. However, we assume that a household is more likely to choose EDUCO if a municipality is considered a priority by

[8] An alternative way to estimate selection on unobservables is to use 2SLS or IV techniques without focusing on Mills ratios. We are reformulating the model in this way in subsequent drafts.

the government. We then use the prioritization formula, P(C), which is a non-linear function of community characteristics C, such as first-grade repetition rates, the percentage of overage students in grades 1-9, the net enrollment rate for grades 1-9, and the percentage of undersized children as an explanatory variable in determining EDUCO participation.

This formula also serves as the exclusion restriction in our model -- the instrumental variable which identifies the selection correction. It undoubtedly affects the likelihood that a student is in an EDUCO program. While geographic variables will also be important in determining achievement, the precise prioritization formula does not -- the weights are exogenously determined by government. The nonlinear way in which geographic variables enter the choice equation is the identifying variable.

More formally, the model is as follows. A household chooses the school type which yields the highest level of indirect utility, V_j. In this case, there are two options, so that j = D (Decentralized EDUCO school), or T (traditional rural school). V_j is a function of X and P. Parents will choose EDUCO if for the ith student:

(3) $D_i^* = V_{Di} - V_{Ti} > 0.$

D* is a latent variable which describes the likelihood that a child is in a decentralized setting. What we do observe is the choice that people make between D and T. We assume then that the latent variable can be characterized as a discrete choice so that: $D_i = 1$ if $D_i^* > 0$ and zero otherwise. By substituting in the determinants of V and linearizing, we can write the choice equation as:

(4) $D_i = W_i\omega + \varepsilon_i$

where $E(\varepsilon_i)=0$, $Var(\varepsilon_i)=\sigma_\varepsilon^2$, $W_i = [X_i \quad P_i]$ and $\omega = [\delta \quad \pi]'$. This can be estimated as a probit model with the appropriate distributional assumptions.

The essence of the selection problem is that $E(u_i, \varepsilon_i) \neq 0$ so that the child i's outcome in school of type D is not observed if that child attends another school of type T. Consequently,

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[9] We are grateful for Diane Steele of the World Bank for this information which she received from a phone interview with MINED staff

$E(u_i | D_i^* > 0) = E(u_i | W_i\omega + \varepsilon_i > 0) \neq 0$. Assuming joint normality between u_i and ε_i, we can rewrite the latter expression as:

(5) $E(u_i | D_i^* > 0) = -\sigma_{u_\varepsilon}\lambda_{Di}$

where $\lambda_{Di} = \phi(W_i\omega)/\Phi(W_i\omega)$, the inverse Mills ratio. Similarly, $E(u_i | D_i^* < 0) = E(u_i | W_i\omega + \varepsilon_i < 0) \neq 0$, which we can rewrite as:

(6) $E(u_i | D_i^* < 0) = \sigma_{u_\varepsilon}\lambda_{Ti}$

where $\lambda_{Ti} = \phi(W_i\omega)/[1-\Phi(W_i\omega)]$. Thus, if we define $e_i = u_i + \sigma_{u_\varepsilon}\lambda_{Di} D_i - \sigma_{u_\varepsilon}\lambda_{Ti}(1-D_i)$, a term whose expectation is zero for each of the cases D = 1, 0, the following regression would yield unbiased parameters:

(7) $Y_i = X_i\beta + C_i\gamma + D_i\alpha - \sigma_{u_\varepsilon}[\lambda_{Di} D_i - \lambda_{Ti}(1-D_i)] + e_i$.

The expected value of the outcome variable for each of the EDUCO and Traditional cases would be:

(8) $E(Y_i | D_i = 1) = X_i\bar{\beta} + C_i\bar{\gamma} + D_i\bar{\alpha} - \sigma_{u_\varepsilon}\lambda_{Di}$

(9) $E(Y_i | D_i = 0) = X_i\bar{\beta} + C_i\bar{\gamma} + \sigma_{u_\varepsilon}\lambda_{Ti}$

To estimate this model, we employ the Heckman two-step method. In the first step, equation (4) is estimated as a probit model and the inverse Mills ratios λ_D and λ_T are calculated by the probit estimation results. In the second step, estimated inverse Mills ratios are used to collect the selection terms. Note that the residuals e_i are heteroscedastic, and thus we should estimate these equations by heteroscedasticity-consistent estimation method. Also, in equation (8) we chose not to restrict the coefficient of the selection term so that one is the negative of the other in order to let the data determine the parameters.

If the error terms in the probit and outcome equations are negatively correlated (this would be so if an unobserved variable, such as student motivation, affected the likelihood of attending EDUCO negatively but student achievement positively), then equation (8) implies that

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the predicted score of a student drawn randomly from the population would be underestimated. Similarly for equation (8) in the case of traditional schools.

3 Data Description

Sampling and questionnaire design. The data were collected by MINED of El Salvador with the assistance of the World Bank and USAID, in a study of 311 schools, 1555 students, and 596 ACE committee members in October 1996. The survey covered 162 municipalities out of 262. These municipalities share responsibility with the central government for the delivery of social services.

Since EDUCO was introduced only in 1991, it was not possible to give achievement tests in 1996 to those students who were about to finish primary education in EDUCO schools and to compare their scores with those in traditional schools. Instead, MINED decided to compare outcomes for third graders. The sampling scheme is designed so that the survey is nationally representative. Moreover, the sample was selected in such a way as to allow for four types of schools -- pure EDUCO, pure traditional, mixed, and private schools -- to be considered. In this study, we dropped students from private schools and traditional public urban schools from the sample since their students are not comparable with the EDUCO students. This left us with 897 students in 38 pure and mixed EDUCO schools and 154 mixed and pure traditional rural schools. In this paper, we present two types of results: those for the entire sample and those for the students in the pure traditional schools only.

The survey is composed of five questionnaires: student, parents, school director, teacher, and parents association questionnaires. The student level data contain information about the student's relationship with his or her guardian, school type, gender, and achievement test results. The parents' data file contains information on family background and living standards, such as parents' education level, household's living standard, and asset ownership. The parents' questionnaire also contains detailed socio-economic information on the student including age, schooling and health status. The school director questionnaire consists of school-level questions

about the director, student enrollment, teachers' quality and quantity, school facilities and finances. The teacher data files contain teacher-specific information such as educational background, years of experience and salaries, as well as classroom-specific information such as the availability of school materials and the frequency of the community association's visits to the classroom. The community and parents' association questionnaire contains qualitative information on the way the association is organized and on the practices regarding their members' participation in school administration and management. The information was collected from ACEs in the case of decentralized EDUCO schools and from their traditional school counterpart organizations, the SdPF, in the case of traditional schools.

Table 1 lists average values for the variables used in the analysis. The columns of table 1 represent variable codes, means and standard deviations of variables for the entire sample, as well as for each school type; i.e., for EDUCO versus traditional school students, for both the whole sample and for the "pure" schools only -- with mixed schools deleted.

Dependent Variables. The achievement tests were applied by MINED on October 1997 with the assistance of the Intercultural Center for Research in Education (MINED 1997). These were applied nationally in the 3rd, 4th and 6th grades, but because EDUCO students had reached only the 3rd grade at the time of the data collection, we use only the third-grade results in the analysis. Also, we focus only on the results for the mathematics and language tests; we do not use the results from the social studies, science, health and environment components.

The mathematics section is composed of 30 questions for ten key subjects, that is, three items for each subject. A student has achieved an objective if she/he got two questions right out of three questions. For the language test, there are 36 questions on nine objectives, that is, four items each. A student has achieved an objective if she/he got three questions right out of four questions. According to Table 1, for this sample, the average student was able to master 3.66 out of 10 subjects in math, but only 1.69 out of 9 in languages. These results are not out of line when compared to national averages (MINED 1997).

Of greater interest are the comparative average values for EDUCO and traditional schools. Students in EDUCO schools score marginally lower than their traditional school counterparts in both subjects, although the differences are not statistically significant. This holds for the entire sample (the first three columns of figures in Table 1), as well as for the subsample of pure schools (the latter three columns). The main issue addressed in this paper is whether this similarity in learning achievement will persist when we hold constant for student and community characteristics, selection and school characteristics.

Besides test scores, we examine another dependent variable that comes from the parents' questionnaire. This is the response to the following question: "In the last 4 weeks, how many days has the student not had class because the teacher was absent?" As mentioned earlier, we interpret this variable to be an important intervening variable which eventually influences student outcomes. Indeed, our comparison of means indicates that, on average for the whole sample, EDUCO students missed 1.57 days out of the past four weeks, compared to 1.72 days for their traditional counterparts.

Explanatory variables. In the previous section, we discussed the set of variables we include in the production function analysis. The means of these variables show the following: Students are divided equally by gender. A significant portion of them live without parents, with a slightly higher proportion among EDUCO students and for the pure subsample. EDUCO students also have a slightly higher number of siblings and are slightly older, although the differences are not significant.

Parents of traditional school students have more education than those of EDUCO students. Fifty-six percent of mothers or female guardians of traditional students have basic education, compared to 51% for EDUCO students. The same is true of fathers. The education differences are reflected also in the asset indicators. Fewer EDUCO parents have access to home-ownership, electricity, sanitary services and running water. These all suggest that EDUCO students come from poorer background than traditional school students.

The socioeconomic characteristics of students are consistent with the pattern for school characteristics. While teacher-pupil ratios and the availability of sanitary facilities are similar in both types, fewer EDUCO schools have access to electricity or piped water. On the other hand, more EDUCO teachers have finished university education but are less experienced. The EDUCO teaching corps consists of relatively young recent graduates who receive a "bonus" for teaching in the program. There are no differences in access to textbooks in the two types of schools. A very large difference is that EDUCO teachers spend double the hours per month meeting with parents; also, parent associations visit classroom almost 4-5 times more often than their traditional counterparts.

The overall picture then is of poor communities who have succeeded in mobilizing parents to be more involved despite their lower standard of living. What we now address is whether these differences persist when we hold constant for selection and student characteristics -- how much of the differences, if any, are due to EDUCO? We first discuss the results for student achievement before proceeding to teacher absenteeism.

4 Empirical Results: Student Achievement

Overall EDUCO Effects: OLS Results. The first question is whether a student in an EDUCO program (as captured by an EDUCO dummy variable) achieves different scores from students in traditional programs. Table 2 presents the regression results for EDUCO schools using OLS for an equation with math and language achievement as dependent variables and student and community (proxied by departmental dummy variables) characteristics as explanatory variables. The principal result is that the dummy variable for EDUCO is negative but not significantly different from zero for both the whole and pure samples, and in both math and languages.

We also tried to distinguish among cohort years by including dummy variables for when schools entered the EDUCO program -- prior to 1995, in 1995 or in 1996. Our hypothesis was that the EDUCO effect may be stronger for those schools which entered the program earlier as

they have learned better how to operate the system. An alternative hypothesis of course is that more recent entrants would have better outcomes if there is a "Hawthorne" effect[2] -- that schools that have more recently entered the program have staff and students who still are motivated and ready to undertake more reforms; but that this enthusiasm may wane over time. As shown in Table 2, the coefficients for EDUCO are indeed greater for more recent entrants into the program and in fact show a positive effect in 1995 for math scores. This is consistent with the hypothesis of Hawthorne effects, but the coefficients are insignificant. Our conclusion from the OLS then is that EDUCO does not have an effect on student achievement

The results for the other coefficients are generally in line with expectations. Female students do significantly worse than their male counterparts in math. In contrast, there are no differences across gender in language results. Parental education has a positive effect generally on outcomes but the coefficients are not significant. Perhaps this is because this is likely to be highly correlated with some of the asset variables. Those with greater assets or access to infrastructure tend to have better outcomes. For example, performance in math increases by almost 10% of the mean achievement for those students who come from households where electricity is available. It is not surprising that homeownership is not significant -- even poor rural households tend to own their own dwellings in El Salvador

Children with more siblings perform worse in both math and language tests. This may indicate that parents devote less time to their individual needs. Older children do better in math than younger ones even though they are in the same grade. However, age does not matter in determining language scores. Higher order reasoning required in math may be related to maturity.

The departmental dummy variables, defined to be relative to the department of Ahuachapan, capture community effects. The negative coefficients are not surprising because the reference category represents a well-endowed department.

The EDUCO effect can be mediated through school-level indicators. To capture this, we enter school-level characteristics in the equation and show the results in Table 3.[10] The EDUCO effect is higher than that in regressions without school-level variables, indicating that a significant portion of the difference between EDUCO and traditional schools can be captured by observable school characteristics. The EDUCO coefficient is generally of the right sign (except for the insignificant results for the language tests). The results for the effects of socioeconomic characteristics do not change.

Most of the school-level variables are insignificantly different from zero. The two exceptions are the availability of school latrines and multigrade classrooms, both of which are positively related to achievement. The former may simply reflect the availability of better supplies at the school level. The latter is consistent with the finding in many other countries, as diverse as Togo, France and Pakistan, that the multigrade setting is conducive to higher achievement.[11] While the demands on a teacher are greater and a higher age variance in one classroom may have possible negative influences, the net impact of multigrade classrooms is positive due to the flexibility in tailoring curricula to the needs of individual students.

Overall EDUCO Effects: Selection Correction. The first stage of the selection correction is to estimate the determinants of EDUCO participation. The most significant variables are those that proxy assets and the variables that capture the government's priority-setting mechanism. As shown in table 4, the availability of electricity, sanitary service and water are negatively correlated with EDUCO participation. Households who are better off have a higher likelihood of being in a traditional school. Government priority is set according to repetition rates, the percentage of overage students, net enrollment rates and stunting among children of primary school age.

[10] We enter them linearly but also interactively with the EDUCO dummy -- EDUCO may change the character of school provision. To conserve space, we do not show the regressions with the interaction terms; they are available from the authors.

[11] From a private conversation with Alain Mingat of IREDU in Dijon, France; reference to be cited in subsequent drafts.

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Table 5 shows the achievement equations with the selection correction as outlined in the earlier section. The effect of EDUCO can be obtained by subtracting equation (9) from equation (8):

(10) $E(Y_i \mid D_i = 1) - E(Y_i \mid D_i = 0) = \hat{\alpha} + \sigma_{u_e}(\lambda_{T_i} - \lambda_{D_i})$

The negative coefficient of the Mills ratio in Table 6 indicates that the error terms of the selection and achievement equations are positively correlated (from equation (7)). This means there is positive selection into EDUCO schools -- EDUCO students have unobserved characteristics that are systematically positively correlated with achievement test scores. This is why, once we hold constant for selection, the negative EDUCO effects are magnified. The results are summarized as follows (using the formula from equation 10):

Without School Inputs

	Whole Sample	Pure Sample
Mathematics	-.207	-.143
Language	-.210	-.170

While the coefficients are negative, the results are not significantly different from zero. We thus conclude that EDUCO's effect on child learning is no different than that of traditional schools even after correcting for selection. The results hold regardless of whether we look at pure or mixed schools.

Table 6 shows the results with school inputs. Basically, the finding that EDUCO and traditional schools are indistinguishable does not change. The EDUCO effect, however, increases somewhat, indicating that some of the score difference can be captured by differences in school characteristics.[12]

[12] The results for the case where school inputs are included are:

	Whole sample	Pure sample
Math	-.125	.020
Lang	-.160	-.057

5 Empirical Results: Days Missed Due to Teacher's Absence

As mentioned earlier, teacher absenteeism is a chronic problem in the public schools of many developing countries. While the excuse is sometimes legitimate, such as sickness, it is more often due to simple dereliction of duty. When these teachers are absent, classes are are usually cancelled since there is often no tradition of using substitute teachers. Our hypothesis is that in a decentralized setting, parents are better able and motivated to monitor teacher behavior. Teachers would thus miss fewer days, which in turn implies, fewer days missed by the students due to teacher absences.

The dependent variable in the regression of Table 7 is the "number of schools days missed by the student due to teacher absences." The principal result is that the EDUCO dummy variable is negative and significant for both the whole and pure samples. A student in an EDUCO program is less likely to miss school days. This result, however, disappears once we hold constant for school characteristics.

Table 7 also runs the same variable on EDUCO dummy variables by year. This is the "vintage" effect. The EDUCO dummy variable for 1991-94 is insignificant -- a student in third grade in EDUCO schools during those years is just as likely as a traditional public school student to miss school due to a teacher absence. However, the EDUCO coefficient is negative and significant for schools that entered the program in 1995 and 1996. This effect persists even after holding constant for school variables for the whole sample, although not for the pure sample. Curiously, the EDUCO effect is stronger for the schools of a more recent vintage. This implies that, while more experience in EDUCO might lead schools to perform better, the earliest schools to enter the program were so disadvantaged relative to others that the outcome effect has gotten stronger with time. This may also be due to the Hawthorne effect.

The coefficient of the selection term is also negative, according to Table 8. This means that there is positive selection into EDUCO with respect to student absences; that is, unobserved characteristics of EDUCO students make them more likely to miss school. Thus, the results of Table 8 indicate that, once we hold constant for selection, EDUCO improves student attendance

for most of the subsamples. EDUCO students miss less school due to teacher absences than traditional school students.

6 Conclusions

El Salvador's EDUCO program has been remarkably successful in expanding educational opportunities for the poor in rural areas. Decentralization has also been instrumental in getting families and communities more involved in their children's schooling. But has the program delivered more? This paper has addressed its contributions in terms of better educational outcomes by raising achievement scores and lowering teacher absenteeism.

The average scores in standardized mathematics and language of EDUCO students are lower than those of their rural traditional school counterparts. This is not surprising since EDUCO students come from distinctly disadvantaged backgrounds. What is interesting is that, even after we hold constant for that background and take into account possible selection bias in the samples, we cannot reject the hypothesis that the average performance of EDUCO and traditional students in the tests is, in fact, the same. The similarity in outcomes holds regardless of how long a school has been in the EDUCO program, although more recent joiners do show an advantage that is not statistically significant different from zero.

There is considerable variance in performance even after holding constant for type of school. The most important socioeconomic background determinants that had a positive effect on student achievement were being male, coming from a family with access to electricity and sanitary service, being an older third grade student, and having fewer siblings. At the school level, the availability of infrastructure services and being in a multigrade classroom had a positive effect on achievement.

The number of days missed due to teacher absences is clearly due to community participation -- this variable was significantly negatively related to the number of visits by

ACEs or their equivalent. Monitoring by parents and their representatives works. In a decentralized setting, parents will be better able to monitor teacher behavior. Teachers would thus miss fewer days, which, in turn, implies fewer days missed by the students.

We conclude that decentralization does not necessarily deliver higher achievement scores than traditional schools in the poor communities that were the highest priorities for rural expansion. This result is not totally unexpected because teachers, parents and parents' associations were not given direct incentives to raise standardized test scores in mathematics and languages. Moreover, greater parental involvement in children's education may inspire children to attend school and put pressure on providers to deliver observable inputs. Indeed, our results also indicate that the EDUCO program significantly lowers the number of days missed by students due to teacher absenteeism. But such involvement may not have a great impact on achievement among communities where adults are not or are barely literate themselves.

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Table 1. Definition, means, and standard deviation of variables by school type

Sample		Whole Sample			Pure Sample		
Variable definitions	Code	All Schools	EDUCO	Traditional	All Schools	EDUCO	Traditional
Achievement test score, math (number of subjects taken)	ma3mas	3.66 (2.48)	3.52 (2.73)	3.70 (2.42)	3.67 (2.56)	3.49 (2.76)	3.73 (2.50)
Achievement test score, language (number of subjects taken)	le3mas	1.69 (1.69)	1.57 (1.77)	1.72 (1.67)	1.74 (1.70)	1.59 (1.74)	1.79 (1.69)
Days of teacher's absence last month	pa_v149	1.42* (2.17)	1.24 (1.87)	1.47* (2.24)	1.34* (2.12)	1.16 (1.70)	1.40* (2.23)
Gender (female=1)	a_d_1d	0.50	0.49	0.50	0.50	0.51	0.50
Live without parent(s)=1	a_c_1d2	0.11	0.13	0.11	0.15	0.17	0.14
Mother enter basic education=1	edl_m	0.55	0.51	0.56	0.53	0.50	0.54
Mother's education missing=1	ed_mm	0.10	0.09	0.10	0.08	0.06	0.09
Father enter basic education=1	edl_p	0.40	0.35	0.41	0.39	0.38	0.40
Father's education missing=1	ed_pm	0.03	0.03	0.04	0.04	0.03	0.04
Number of siblings (age of 4-15)	pa_b3	2.13 (1.67)	2.28 (1.76)	2.09 (1.65)	2.03 (1.57)	2.09 (1.51)	2.01 (1.58)
Own house=1	pa_e1d	0.72	0.70	0.73	0.71	0.68	0.72
Electricity available=1	pa_e81d	0.55	0.30	0.61	0.56	0.29	0.65
Sanitary service available=1	pa_e82d	0.16	0.06	0.19	0.18	0.07	0.21
Water available=1	pa_e85d	0.05	0.01	0.07	0.06	0.01	0.08
Child's age	childage	10.51 (1.75)	10.73 (1.74)	10.46 (1.74)	10.58 (1.68)	10.85 (1.8)	10.49 (1.63)
Teaher-pupil ratio (school level)	d_p_all	0.04 (0.05)	0.05 (0.08)	0.04 (0.04)	0.04 (0.06)	0.05 (0.09)	0.04 (0.04)
If sanitation/latrine available at shool=1	d_d11d	0.93	0.94	0.93	0.94	0.93	0.94
If electricity available at school=1	d_d12d	0.67	0.38	0.74	0.69	0.32	0.81
If piped water available at school=1	d_d21d	0.34	0.17	0.38	0.32	0.12	0.38
=1 if teacher finish University education	predu_un	0.41	0.66	0.35	0.47	0.74	0.39
years of teacher experience	pr_year	7.96 (7.14)	4.27 (2.48)	8.90 (7.62)	7.88 (6.59)	4.46 (2.66)	8.96 (7.08)
Monthly base salary of teacher	pr_c2	3018.12 (603.97)	2934.06 (237.42)	3039.37 (663.85)	3024.16 (520.93)	2906.84 (264.43)	3061.35 (574.27)
If teacher receive bonus=1	pr_bonu	0.63	0.63	0.63	0.62	0.73	0.59
If all students have math textbook=1	pr_math	0.62	0.51	0.65	0.62	0.60	0.62
If all students have language textbook=1	pr_lang	0.60	0.51	0.62	0.61	0.61	0.61
=1 if teacher teaches in multigrade classroom	pr_d15d	0.23	0.33	0.21	0.24	0.37	0.20
Teacher's hours per month meeting with parents	pr_f123	2.04 (4.07)	4.46 (3.05)	3.00 (2.47)	2.48 (4.77)	5.01 (3.26)	2.99 (2.48)
# of ACE/SpDF's visits to classroom	pr_d11	3.30 (2.66)	4.46 (5.68)	1.43 (3.28)	3.47 (2.82)	5.21 (6.35)	1.62 (3.76)
=1 if Government's first priority	pr1	0.17	0.22	0.15	0.14	0.26	0.10
=1 if Government's second priority	pr2	0.17	0.33	0.13	0.12	0.33	0.05
=1 if Government's third priority	pr3	0.09	0.11	0.08	0.08	0.11	0.07
Inversed Mills Ratio	i_mills	0.51 (0.43)	1.22 (0.34)	0.31 (0.20)	0.54 (0.46)	0.96 (0.47)	0.30 (0.28)
Number of Observations	N	897	181	716	565	136	429

Note: Standard errors are in parentheses

* Number of Obsevations is N-1 due to a missing observation

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Table 2. OLS (Robust Standard Error) Regression
Dependent Variable: Mathematics or Language Tests

Samples		Whole				Pure			
Tests		Math		Lang		Math		Lang	
variables	code	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
		t	t	t	t	t	t	t	t
Constant	_cons	3.438	3.512	2.140	2.130	2.520	2.688	1.640	1.635
		4.830	4.878	4.194	4.184	2.414	2.598	2.497	2.471
=1 if EDUCO	e_w	-0.089		-0.150		-0.013		-0.098	
		-0.383		-0.945		-0.046		-0.521	
=1 if EDUCO built in 91-94	ed91_94		-0.291		-0.099		-0.275		-0.071
			-0.800		-0.394		-0.716		-0.269
=1 if EDUCO built in 95	ed95		0.474		0.094		0.259		-0.002
			0.944		0.293		0.463		-0.007
=1 if EDUCO build in 96	ed96		0.202		-0.134		0.318		-0.193
			0.481		-0.479		0.594		-0.560
=1 if year missing	ed_miss		-0.270		-0.280		-0.278		-0.166
			-0.540		-0.881		-0.390		-0.375
=1 if mixed traditional	trad_m		0.228		0.115				
			1.164		0.844				
Gender (female=1)	a_d_1d	-0.480	-0.496	0.075	0.071	-0.472	-0.491	0.057	0.058
		-2.929	-3.006	0.664	0.621	-2.229	-2.297	0.392	0.394
Live without parent(s)=1	a_c_1d2	-0.052	-0.008	0.174	0.186	0.149	0.164	0.458	0.459
		-0.169	-0.027	0.858	0.912	0.420	0.462	1.947	1.944
Mother enter basic education=1	edl_m	0.145	0.141	0.033	0.032	0.228	0.231	0.119	0.122
		0.757	0.734	0.254	0.241	0.909	0.915	0.697	0.714
Mother's education missing=1	ed_mm	-0.059	-0.055	-0.052	-0.047	-0.134	-0.115	-0.007	-0.005
		-0.188	-0.176	-0.268	-0.244	-0.338	-0.287	-0.027	-0.019
Father enter basic education=1	edl_p	0.039	0.046	0.113	0.110	-0.087	-0.067	0.158	0.155
		0.225	0.260	0.896	0.868	-0.379	-0.292	1.000	0.980
Father's education missing=1	ed_pm	0.414	0.439	-0.062	-0.058	0.973	0.962	0.007	-0.001
		0.904	0.956	-0.208	-0.195	1.812	1.802	0.019	-0.004
Number of siblings (age of 4-15)	pa_b3	-0.107	-0.109	-0.073	-0.074	-0.080	-0.077	-0.043	-0.043
		-2.101	-2.136	-2.137	-2.135	-1.158	-1.124	-0.887	-0.900
Own house=1	pa_e1d	-0.054	-0.052	0.026	0.026	-0.021	-0.032	0.072	0.068
		-0.283	-0.275	0.189	0.187	-0.085	-0.129	0.418	0.391
Electricity available=1	pa_e81d	0.395	0.402	0.245	0.252	0.315	0.310	0.219	0.225
		2.077	2.107	1.956	1.999	1.218	1.200	1.391	1.419
Sanitary service available=1	pa_e82d	0.396	0.392	0.213	0.216	0.735	0.704	0.637	0.636
		1.672	1.661	1.262	1.275	2.420	2.336	2.905	2.887
Water available=1	pa_e85d	0.025	0.058	-0.518	-0.510	-0.165	-0.132	-0.909	-0.913
		0.079	0.182	-2.004	-1.969	-0.392	-0.316	-2.880	-2.879
Child's age	childage	0.130	0.125	0.042	0.041	0.212	0.202	0.063	0.063
		2.775	2.700	1.206	1.177	3.224	3.118	1.355	1.349
Department Dummy (Santa Ana)	ld_a3_2	-0.322	-0.397	-0.631	-0.620	-0.447	-0.533	-0.679	-0.668
		-0.602	-0.721	-1.667	-1.613	-0.610	-0.723	-1.577	-1.524
Department Dummy (Sonsonate)	ld_a3_3	-0.337	-0.524	-0.892	-0.939	-0.306	-0.418	-0.667	-0.668
		-0.625	-0.963	-2.462	-2.564	-0.395	-0.539	-1.485	-1.480
Department Dummy (Chalatenango)	ld_a3_4	-0.964	-1.030	-1.270	-1.267				
		-1.704	-1.807	-3.400	-3.401				
Department Dummy (La Libertad)	ld_a3_5	-1.229	-1.302	-0.886	-0.909	-1.279	-1.300	-0.759	-0.754
		-2.420	-2.526	-2.474	-2.515	-1.747	-1.778	-1.758	-1.735
Department Dummy (San Salvador)	ld_a3_6	-0.565	-0.673	-0.735	-0.742	-0.482	-0.576	-0.714	-0.702
		-1.077	-1.246	-1.975	-1.956	-0.662	-0.785	-1.629	-1.575
Department Dummy (Cuscat Land)	ld_a3_7	-1.090	-1.165	-1.368	-1.387	-1.308	-1.239	-1.209	-1.190
		-1.830	-1.939	-3.407	-3.440	-1.488	-1.364	-2.456	-2.353
Department Dummy (La Paz)	ld_a3_8	-1.279	-1.445	-0.756	-0.800	-1.390	-1.519	-0.742	-0.757
		-2.248	-2.442	-1.978	-2.029	-1.775	-1.896	-1.664	-1.653
Department Dummy (Cabanas)	ld_a3_9	-1.275	-1.303	-1.014	-1.011	-1.771	-1.800	-1.072	-1.066
		-2.011	-2.028	-2.355	-2.334	-2.107	-2.134	-2.111	-2.082
Department Dummy (San Vincente)	ld_a3_10	-1.996	-2.138	-1.520	-1.576	-2.105	-2.161	-1.471	-1.487
		-3.347	-3.620	-3.743	-3.876	-2.554	-2.674	-2.983	-3.035
Department Dummy (Usulutan)	ld_a3_11	-1.816	-1.967	-1.440	-1.498	-2.209	-2.192	-1.699	-1.698
		-3.474	-3.709	-4.088	-4.199	-2.800	-2.791	-4.009	-3.991
Department Dummy (San Miguel)	ld_a3_12	-0.822	-0.914	-0.745	-0.739	-0.872	-0.945	-0.768	-0.747
		-1.527	-1.674	-2.080	-2.044	-1.120	-1.210	-1.812	-1.730
Department Dummy (Morazan)	ld_a3_13	-1.616	-1.779	-1.586	-1.626	-2.054	-2.166	-1.456	-1.428
		-2.942	-3.216	-4.325	-4.380	-2.415	-2.572	-2.926	-2.846
Department Dummy (La Union)	ld_a3_14	-1.205	-1.293	-1.270	-1.289	-1.519	-1.569	-1.349	-1.349
		-2.238	-2.367	-3.484	-3.496	-2.008	-2.074	-3.137	-3.101
	N	897	897	897	897	565	565	565	565
	R^2	0.087	0.091	0.071	0.072	0.115	0.118	0.094	0.094

Table 3. OLS (Robust Standard Error) Regression with School Inputs
Dependent Variable: Mathematics or Language Tests

Sample		Whole				Pure			
		Math		Lang		Math		Lang	
variables	code	Coef.	Coef.	Coef	Coef.	Coef.	Coef.	Coef.	Coef.
		t	t	t	t	t	t	t	t
Constant	_cons	3.226	3.225	1.809	1.811	2.799	2.960	2.225	2.315
		3.474	3.439	2.895	2.890	2.070	2.179	2.713	2.821
=1 if EDUCO	e_w	0.021		-0.103		0.201		0.036	
		0.080		-0.557		0.575		0.146	
=1 if EDUCO built in 91-94	ed91_94		-0.118		-0.117		0.227		0.080
			-0.293		-0.397		0.499		0.235
=1 if EDUCO built in 95	ed95		0.681		0.363		0.918		0.590
			1.270		0.990		1.387		1.386
=1 if EDUCO build in 96	ed96		0.217		-0.102		0.112		-0.176
			0.479		-0.332		0.186		-0.445
=1 if year missing	ed_miss		-0.166		-0.272		-0.553		-0.364
			-0.325		-0.825		-0.764		-0.757
=1 if mixed traditional	trad_m		0.202		0.100		(droppe		(droppe
			1.023		0.722		d)		d)
Gender (female=1)	a_d_1d	-0.492	-0.507	0.074	0.066	-0.477	-0.488	0.074	0.072
		-3.018	-3.086	0.650	0.574	-2.261	-2.297	0.505	0.486
Live without parent(s)=1	a_c_1d2	-0.029	0.003	0.166	0.181	0.234	0.255	0.496	0.508
		-0.093	0.009	0.815	0.886	0.647	0.704	2.066	2.119
Mother enter basic education=1	edl_m	0.174	0.176	0.050	0.054	0.212	0.241	0.122	0.142
		0.908	0.914	0.379	0.403	0.841	0.946	0.696	0.808
Mother's education missing=1	ed_mm	-0.084	-0.058	-0.042	-0.018	-0.071	-0.004	0.049	0.091
		-0.268	-0.185	-0.217	-0.094	-0.175	-0.010	0.184	0.340
Father enter basic education=1	edl_p	0.041	0.041	0.122	0.118	-0.082	-0.089	0.137	0.128
		0.234	0.231	0.958	0.920	-0.356	-0.385	0.848	0.796
Father's education missing=1	ed_pm	0.481	0.491	-0.030	-0.035	1.043	0.974	0.011	-0.034
		1.044	1.059	-0.097	-0.113	1.934	1.818	0.028	-0.089
Number of siblings (age of 4-15)	pa_b3	-0.109	-0.110	-0.079	-0.079	-0.075	-0.078	-0.043	-0.045
		-2.127	-2.134	-2.255	-2.237	-1.085	-1.115	-0.879	-0.929
Own house=1	pa_e1d	-0.036	-0.039	0.030	0.025	-0.032	-0.079	0.067	0.036
		-0.186	-0.204	0.217	0.182	-0.128	-0.310	0.377	0.199
Electricity available=1	pa_e81d	0.407	0.402	0.241	0.242	0.323	0.319	0.188	0.197
		1.895	1.870	1.744	1.731	1.134	1.124	1.097	1.137
Sanitary service available=1	pa_e82d	0.438	0.436	0.238	0.238	0.753	0.736	0.664	0.658
		1.829	1.822	1.404	1.403	2.473	2.433	2.974	2.970
Water available=1	pa_e85d	-0.033	-0.017	-0.478	-0.474	-0.278	-0.270	-0.982	-0.979
		-0.098	-0.052	-1.790	-1.771	-0.607	-0.585	-2.982	-2.970
Child's age	childage	0.126	0.123	0.044	0.042	0.188	0.180	0.059	0.055
		2.687	2.645	1.245	1.187	2.792	2.699	1.195	1.122
Teaher-pupil ratio (school level)	d_p_all	-0.205	0.273	-0.337	-0.177	-0.848	-0.597	-0.353	-0.226
		-0.153	0.198	-0.348	-0.174	-0.573	-0.377	-0.339	-0.207
Sanitation/latrine available at shool	d_d11d	0.360	0.390	0.457	0.487	0.661	0.701	0.179	0.232
		1.171	1.258	2.191	2.281	1.491	1.538	0.553	0.699
Electricity available at school	d_d12d	-0.032	0.010	0.036	0.053	-0.021	0.032	0.095	0.116
		-0.134	0.042	0.211	0.306	-0.062	0.094	0.413	0.493
Piped water available at school	d_d21d	0.236	0.187	-0.132	-0.156	0.424	0.392	0.027	0.000
		1.149	0.902	-0.904	-1.059	1.424	1.293	0.128	-0.001
=1 if teacher finish university	predu_un	-0.311	-0.264	0.003	0.036	-0.265	-0.217	0.131	0.165
		-1.584	-1.311	0.025	0.252	-0.992	-0.796	0.691	0.852
year of teachers experience	pr_year	0.015	0.015	0.005	0.005	0.011	0.009	0.009	0.009
		0.974	0.998	0.460	0.469	0.476	0.396	0.562	0.498
Monthly base salary of teacher	pr_c2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		-0.297	-0.276	-0.797	-0.755	-0.499	-0.537	-1.466	-1.523
If teacher receive bonus=1	pr_bonu	0.137	0.109	0.077	0.056	-0.128	-0.185	-0.137	-0.173
		0.790	0.621	0.615	0.436	-0.529	-0.754	-0.808	-0.997
If all students have math textbook=1	pr_math	0.048	0.065	0.302	0.309	0.159	0.274	0.210	0.275
		0.158	0.209	1.438	1.466	0.397	0.671	0.747	0.970
All students have language textbook	pr_lang	-0.336	-0.324	-0.126	-0.127	-0.674	-0.801	-0.187	-0.265
		-1.093	-1.042	-0.590	-0.585	-1.720	-1.994	-0.669	-0.908
=1 if teach in multigrade class	pr_d15d	0.643	0.646	0.129	0.138	0.801	0.854	0.129	0.185
		2.982	2.990	0.890	0.944	2.930	3.097	0.707	0.996
# of ACE/SpDF's visits to classroom	pr_d11	0.007	-0.001	-0.009	-0.016	-0.030	-0.045	-0.036	-0.048
		0.332	-0.040	-0.636	-1.005	-1.289	-1.819	-2.260	-2.757
Teacher's meeting with parents	pr_f123	-0.032	-0.038	0.002	-0.002	-0.002	-0.008	0.015	0.008
		-0.864	-1.009	0.084	-0.090	-0.052	-0.155	0.442	0.240
Department Dummy (Santa Ana)	ld_a3_2	-0.343	-0.404	-0.709	-0.730	-0.760	-0.816	-0.840	-0.872
		-0.638	-0.730	-1.836	-1.861	-1.044	-1.106	-1.848	-1.889

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Sample		Whole				Pure			
		Math		Lang		Math		Lang	
variables	code	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
		t	t	t	t	t	t	t	t
Department Dummy (Sonsonate)	Id_a3_3	-0.311	-0.526	-0.994	-1.106	-0.521	-0.707	-0.916	-1.052
		-0.578	-0.943	-2.689	-2.920	-0.681	-0.880	-1.973	-2.192
Department Dummy (Chalatenango)	Id_a3_4	-1.169	-1.209	-1.326	-1.334				
		-2.004	-2.050	-3.428	-3.451				
Department Dummy (La Libertad)	Id_a3_5	-1.145	-1.224	-0.966	-1.009	-1.402	-1.427	-0.965	-0.988
		-2.242	-2.355	-2.677	-2.777	-1.970	-1.983	-2.208	-2.237
Department Dummy (San Salvador)	Id_a3_6	-0.544	-0.626	-0.699	-0.719	-0.487	-0.487	-0.740	-0.719
		-1.014	-1.131	-1.813	-1.825	-0.682	-0.666	-1.629	-1.536
Department Dummy (Cuscat Land)	Id_a3_7	-1.120	-1.157	-1.458	-1.458	-1.099	-0.836	-1.264	-1.113
		-1.774	-1.808	-3.331	-3.321	-1.250	-0.912	-2.405	-2.033
Department Dummy (La Paz)	Id_a3_8	-1.233	-1.361	-0.826	-0.895	-1.330	-1.447	-0.757	-0.833
		-2.138	-2.290	-2.118	-2.246	-1.708	-1.802	-1.647	-1.761
Department Dummy (Cabanas)	Id_a3_9	-1.380	-1.394	-1.136	-1.143	-1.957	-1.975	-1.205	-1.225
		-2.136	-2.123	-2.536	-2.528	-2.314	-2.309	-2.269	-2.272
Department Dummy (San Vincente)	d_a3_10	-1.911	-2.041	-1.599	-1.674	-1.990	-2.072	-1.370	-1.436
		-3.129	-3.374	-3.762	-3.967	-2.481	-2.596	-2.668	-2.852
Department Dummy (Usulutan)	d_a3_11	-1.738	-1.904	-1.504	-1.593	-2.191	-2.232	-1.933	-1.962
		-3.250	-3.501	-4.117	-4.314	-2.751	-2.777	-4.231	-4.272
Department Dummy (San Miguel)	d_a3_12	-0.987	-1.064	-0.853	-0.869	-1.243	-1.225	-0.952	-0.939
		-1.762	-1.871	-2.273	-2.296	-1.600	-1.548	-2.183	-2.104
Department Dummy (Morazan)	d_a3_13	-1.588	-1.723	-1.581	-1.630	-1.842	-1.743	-1.452	-1.354
		-2.811	-3.008	-4.118	-4.196	-2.070	-1.920	-2.563	-2.317
Department Dummy (La Union)	d_a3_14	-1.162	-1.260	-1.404	-1.456	-1.720	-1.803	-1.498	-1.565
		-2.143	-2.291	-3.714	-3.800	-2.333	-2.410	-3.376	-3.469
	N	897	897	897	897	565	565	565	565
	R^2	0.103	0.107	0.082	0.085	0.145	0.149	0.109	0.115
EDUCO effect		**0.021**		**-0.103**		**0.201**		**0.036**	

Table 4. Probit analysis: Dependent variable: school choice: EDUCO (=1), Traditional (=0)

Explanatory variable	Variable names	Coefficient Whole sample	Coefficient Pure sample	z Whole sample	z Pure sample
Constant		-0.984	-1.377	-2.793	-2.707
Gender (female=1)	a_d_1d	-0.085	-0.169	-1.244	-0.827
Live without parent(s)=1	a_c_1d2	0.270	0.233	1.107	1.553
Mother entered basic education=1	edl_m	0.094	0.090	0.582	0.810
Mother's education missing=1	ed_mm	-0.166	-0.522	-1.765	-0.877
Father entered basic education=1	edl_p	-0.153	0.028	0.183	-1.322
Father's education missing=1	ed_pm	-0.137	0.061	0.161	-0.444
Number of siblings (age of 4-15)	pa_b3	0.006	-0.016	-0.359	0.181
Own house=1	pa_e1d	-0.092	-0.225	-1.520	-0.796
Electricity available=1	pa_e81d	-0.503	-0.565	-3.909	-4.562
Sanitary service available=1	pa_e82d	-0.458	-0.320	-1.452	-2.518
Water available=1	pa_e85d	-0.791	-0.791	-1.544	-1.707
Child's age	hildage	0.025	0.068	1.729	0.857
Government 1st priority	pr1	0.431	1.011	5.584	3.074
Government 2nd priority	pr2	0.772	1.545	7.988	5.775
Government 3rd priority	pr3	0.406	0.741	3.368	2.306
ln L		-394.217	-233.696		
N		897	565		

Table 5. OLS (Robust Standard Error) Regression without School Inputs and with Self-selection
Dependent Variable: Mathematics or Language Tests

Sample		Whole				Pure			
		Math		Lang		Math		Lang	
Specification		1-s	1y-s	1-s	1y-s	1-s	1y-s	1-s	1y-s
variables	code	Coef. t	Coef. t	Coef. t	Coef. t	Coef. t	Coef. t	Coef. t	Coef. t
Constant	_cons	3.982 5.128	3.957 5.075	2.433 4.584	2.412 4.528	2.901 2.706	2.963 2.787	1.856 2.826	1.821 2.732
=1 if EDUCO	e_w	-1.726 -1.829		-1.031 -1.628		-1.167 -1.799		-0.753 -1.852	
=1 if EDUCO built in 91-94	ed91_94		-1.742 -1.842		-1.019 -1.587		-1.207 -1.874		-0.702 -1.658
=1 if EDUCO built in 95	ed95		-1.249 -1.069		-0.998 -1.303		-0.994 -1.124		-0.851 -1.481
=1 if EDUCO build in 96	ed96		-1.428 -1.296		-1.167 -1.688		-0.810 -0.928		-0.957 -1.823
=1 if year missing	ed_miss		-1.798 -1.647		-1.249 -1.734		-1.264 -1.302		-0.834 -1.443
=1 if mixed traditional	trad_m		0.299 1.497		0.160 1.157		(droppe d)		(droppe d)
Gender (female=1)	a_d_1d	-0.511 -3.095	-0.522 -3.144	0.058 0.515	0.055 0.480	-0.503 -2.360	-0.512 -2.387	0.040 0.274	0.044 0.298
Live without parent(s)=1	a_c_1d2	0.073 0.236	0.108 0.348	0.241 1.172	0.260 1.265	0.258 0.724	0.257 0.720	0.520 2.196	0.522 2.199
Mother enter basic education=1	edl_m	0.178 0.927	0.169 0.882	0.051 0.389	0.050 0.378	0.266 1.056	0.264 1.043	0.140 0.818	0.144 0.840
Mother's education missing=1	ed_mm	-0.110 -0.352	-0.112 -0.362	-0.079 -0.414	-0.083 -0.435	-0.205 -0.518	-0.187 -0.467	-0.048 -0.185	-0.054 -0.207
Father enter basic education=1	edl_p	-0.011 -0.061	-0.008 -0.047	0.086 0.675	0.075 0.590	-0.066 -0.288	-0.056 -0.244	0.169 1.069	0.163 1.025
Father's education missing=1	ed_pm	0.354 0.774	0.387 0.841	-0.094 -0.318	-0.091 -0.308	0.919 1.715	0.919 1.717	-0.024 -0.064	-0.031 -0.082
Number of siblings (age of 4-15)	pa_b3	-0.096 -1.901	-0.099 -1.944	-0.068 -1.980	-0.068 -1.962	-0.076 -1.117	-0.075 -1.098	-0.041 -0.854	-0.042 -0.875
Own house=1	pa_e1d	-0.106 -0.564	-0.101 -0.533	-0.003 -0.019	-0.006 -0.041	-0.092 -0.368	-0.092 -0.364	0.032 0.186	0.028 0.158
Electricity available=1	pa_e81d	0.128 0.513	0.145 0.571	0.101 0.641	0.089 0.554	0.079 0.268	0.089 0.298	0.085 0.484	0.076 0.421
Sanitary service available=1	pa_e82d	0.248 1.015	0.256 1.040	0.133 0.775	0.130 0.746	0.638 2.133	0.632 2.115	0.582 2.710	0.586 2.721
Water available=1	pa_e85d	-0.093 -0.283	-0.057 -0.172	-0.581 -2.208	-0.583 -2.204	-0.247 -0.576	-0.219 -0.510	-0.956 -3.021	-0.972 -3.042
Child's age	childage	0.136 2.907	0.133 2.871	0.045 1.286	0.046 1.309	0.221 3.393	0.215 3.316	0.069 1.462	0.072 1.516
Department Dummy (Santa Ana)	ld_a3_2	-0.480 -0.884	-0.492 -0.885	-0.717 -1.881	-0.681 -1.756	-0.572 -0.766	-0.610 -0.815	-0.750 -1.720	-0.720 -1.618
Department Dummy (Sonsonate)	ld_a3_3	-0.424 -0.785	-0.561 -1.025	-0.939 -2.592	-0.962 -2.616	-0.364 -0.463	-0.407 -0.514	-0.700 -1.543	-0.660 -1.437
Department Dummy (Chalatenango)	ld_a3_4	-1.076 -1.870	-1.104 -1.910	-1.331 -3.533	-1.314 -3.491				
Department Dummy (La Libertad)	ld_a3_5	-1.290 -2.526	-1.343 -2.587	-0.919 -2.562	-0.935 -2.571	-1.270 -1.706	-1.282 -1.719	-0.753 -1.729	-0.741 -1.677
Department Dummy (San Salvador)	ld_a3_6	-0.638 -1.205	-0.695 -1.277	-0.774 -2.077	-0.756 -1.984	-0.605 -0.817	-0.649 -0.871	-0.784 -1.765	-0.752 -1.661
Department Dummy (Cuscat Land)	ld_a3_7	-1.222 -2.039	-1.293 -2.136	-1.439 -3.583	-1.468 -3.635	-1.411 -1.585	-1.351 -1.464	-1.267 -2.554	-1.266 -2.464
Department Dummy (La Paz)	ld_a3_8	-1.374 -2.405	-1.467 -2.476	-0.807 -2.110	-0.813 -2.063	-1.455 -1.837	-1.502 -1.851	-0.779 -1.735	-0.745 -1.608
Department Dummy (Cabanas)	ld_a3_9	-1.290 -2.026	-1.281 -1.988	-1.022 -2.356	-0.997 -2.289	-1.541 -1.785	-1.578 -1.814	-0.941 -1.810	-0.916 -1.730
Department Dummy (San Vincente)	d_a3_10	-2.033 -3.416	-2.146 -3.608	-1.540 -3.825	-1.580 -3.899	-2.073 -2.484	-2.093 -2.529	-1.453 -2.965	-1.441 -2.923
Department Dummy (Usulutan)	d_a3_11	-1.884 -3.586	-2.019 -3.781	-1.476 -4.181	-1.531 -4.265	-2.237 -2.798	-2.227 -2.793	-1.715 -3.990	-1.722 -3.967
Department Dummy (San Miguel)	d_a3_12	-0.862 -1.586	-0.913 -1.659	-0.767 -2.131	-0.738 -2.032	-0.883 -1.113	-0.923 -1.161	-0.774 -1.805	-0.732 -1.666
Department Dummy (Morazan)	d_a3_13	-1.588 -2.910	-1.727 -3.123	-1.571 -4.277	-1.593 -4.262	-1.876 -2.216	-1.968 -2.307	-1.354 -2.662	-1.294 -2.485

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Sample		Whole				Pure			
		Math		Lang		Math		Lang	
Specification		1-s	1y-s	1-s	1y-s	1-s	1y-s	1-s	1y-s
variables	code	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
		t	t	t	t	t	t	t	t
Department Dummy	d_a3_14	-1.283	-1.329	-1.312	-1.313	-1.543	-1.563	-1.363	-1.345
(La Union)		-2.369	-2.419	-3.588	-3.539	-2.013	-2.031	-3.141	-3.040
Inverse Mills Ratio	i_mills	-0.993	-0.969	-0.535	-0.614	-0.813	-0.743	-0.462	-0.503
		-1.778	-1.622	-1.392	-1.525	-1.976	-1.729	-1.750	-1.782
	N	897	897	897	897	565	565	565	565
	R^2	0.091	0.094	0.083	0.075	0.122	0.123	0.099	0.099
EDUCO effect (unconditional)		**-1.726**		**-1.031**		**-1.167**		**-0.753**	
EDUCO effect (conditional)		**-0.207**		**-0.21**		**-0.143**		**-0.17**	

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Table 6. OLS (Robust Standard Error) Regression with School Inputs and with Self-selection Dependent Variable: Mathematics or Language Tests

Sample		Whole				Pure			
		Math		Lang		Math		Lang	
Specification		2-s	2y-s	2-s	2y-s	2-s	2y-s	2-s	2-s
variables	code	Coef. t	Coef. t	Coef. t	Coef. t	Coef. t	Coef. t	Coef. t	Coef. t
Constant	_cons	3.853 3.910	3.786 3.833	2.071 3.195	2.031 3.124	3.091 2.254	3.149 2.292	2.374 2.896	2.402 2.925
=1 if EDUCO	e_w	-1.794 -1.863		-0.860 -1.286		-0.911 -1.248		-0.532 -1.077	
=1 if EDUCO built in 91-94	ed91_94		-1.772 -1.804		-0.764 -1.122		-0.618 -0.834		-0.310 -0.591
=1 if EDUCO built in 95	ed95		-1.303 -1.058		-0.414 -0.502		-0.291 -0.274		0.033 0.045
=1 if EDUCO build in 96	ed96		-1.639 -1.444		-0.828 -1.141		-0.902 -0.941		-0.643 -1.045
=1 if year missing	ed_miss		-1.887 -1.718		-0.945 -1.271		-1.409 -1.431		-0.758 -1.210
=1 if mixed traditional	trad_m		0.283 1.402		0.132 0.931		(droppe d)		(droppe d)
Gender (female=1)	a_d_1d	-0.528 -3.218	-0.536 -3.247	0.058 0.515	0.054 0.475	-0.507 -2.388	-0.507 -2.379	0.059 0.404	0.063 0.426
Live without parent(s)=1	a_c_1d2	0.109 0.350	0.134 0.424	0.224 1.081	0.232 1.127	0.328 0.902	0.330 0.900	0.544 2.244	0.542 2.243
Mother enter basic education=1	edl_m	0.212 1.108	0.207 1.077	0.067 0.497	0.066 0.494	0.243 0.958	0.259 1.014	0.138 0.779	0.151 0.850
Mother's education missing=1	ed_mm	-0.139 -0.446	-0.127 -0.406	-0.065 -0.336	-0.046 -0.233	-0.120 -0.298	-0.066 -0.162	0.024 0.091	0.063 0.237
Father enter basic education=1	edl_p	-0.016 -0.091	-0.022 -0.120	0.098 0.762	0.093 0.722	-0.066 -0.287	-0.081 -0.349	0.145 0.893	0.132 0.817
Father's education missing=1	ed_pm	0.420 0.913	0.437 0.946	-0.056 -0.178	-0.056 -0.182	0.981 1.820	0.935 1.744	-0.020 -0.052	-0.053 -0.136
Number of siblings (age of 4-15)	pa_b3	-0.098 -1.904	-0.099 -1.910	-0.074 -2.121	-0.075 -2.111	-0.071 -1.026	-0.074 -1.061	-0.041 -0.837	-0.043 -0.894
Own house=1	pa_e1d	-0.096 -0.503	-0.097 -0.502	0.005 0.033	0.003 0.019	-0.095 -0.377	-0.123 -0.481	0.035 0.197	0.015 0.085
Electricity available=1	pa_e81d	0.132 0.497	0.132 0.482	0.127 0.762	0.136 0.793	0.136 0.433	0.162 0.513	0.092 0.503	0.124 0.660
Sanitary service available=1	pa_e82d	0.272 1.105	0.278 1.122	0.169 0.976	0.177 1.009	0.667 2.245	0.678 2.274	0.620 2.856	0.631 2.910
Water available=1	pa_e85d	-0.175 -0.503	-0.153 -0.436	-0.538 -1.958	-0.527 -1.917	-0.376 -0.798	-0.357 -0.751	-1.031 -3.099	-1.019 -3.046
Child's age	childage	0.132 2.838	0.131 2.823	0.047 1.314	0.045 1.269	0.198 2.946	0.191 2.846	0.064 1.288	0.060 1.205
Teaher-pupil ratio (school level)	d_p_all	0.316 0.245	0.571 0.429	-0.119 -0.124	-0.060 -0.060	-0.202 -0.136	-0.289 -0.184	-0.023 -0.022	-0.084 -0.077
Sanitation/latrine available at shool	d_d11d	0.297 0.961	0.322 1.040	0.431 2.061	0.461 2.148	0.511 1.125	0.566 1.223	0.103 0.312	0.170 0.499
Electricity available at school	d_d12d	-0.055 -0.234	-0.014 -0.058	0.026 0.154	0.043 0.252	-0.053 -0.162	-0.016 -0.048	0.079 0.339	0.094 0.395
Piped water available at school	d_d21d	0.232 1.128	0.187 0.905	-0.133 -0.915	-0.156 -1.057	0.418 1.397	0.419 1.376	0.024 0.113	0.012 0.057
=1 if teacher finish university	predu_un	-0.311 -1.582	-0.277 -1.373	0.003 0.023	0.030 0.215	-0.246 -0.918	-0.221 -0.808	0.141 0.738	0.163 0.841
year of teachers experience	pr_year	0.015 0.981	0.015 0.987	0.005 0.462	0.005 0.460	0.010 0.425	0.008 0.322	0.009 0.525	0.008 0.450
Monthly base salary of teacher	pr_c2	0.000 -0.262	0.000 -0.229	0.000 -0.774	0.000 -0.727	0.000 -0.289	0.000 -0.328	0.000 -1.290	0.000 -1.354
If teacher receive bonus=1	pr_bonu	0.142 0.821	0.107 0.610	0.079 0.633	0.055 0.430	-0.087 -0.356	-0.142 -0.578	-0.116 -0.677	-0.154 -0.875
If all students have math textbook=1	pr_math	0.028 0.089	0.027 0.084	0.293 1.382	0.294 1.379	0.118 0.291	0.206 0.500	0.189 0.668	0.244 0.855
All students have language textbook	pr_lang	-0.329 -1.062	-0.325 -1.039	-0.124 -0.571	-0.128 -0.584	-0.659 -1.651	-0.782 -1.927	-0.179 -0.634	-0.256 -0.874
=1 if teach in multigrade class	pr_d15d	0.672 3.127	0.665 3.084	0.141 0.975	0.145 0.997	0.831 3.039	0.876 3.174	0.144 0.795	0.195 1.049
# of ACE/SpDF's visits to classroom	pr_d11	0.006 0.298	0.002 0.092	-0.010 -0.669	-0.015 -0.933	-0.028 -1.250	-0.039 -1.558	-0.036 -2.258	-0.045 -2.564

Sample		Whole				Pure			
		Math		Lang		Math		Lang	
Specification		2-s	2y-s	2-s	2y-s	2-s	2y-s	2-s	2-s
variables	code	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
		t	t	t	t	t	t	t	t
Teacher's meeting with parents	pr_f123	-0.030	-0.036	0.003	-0.002	0.003	0.000	0.018	0.012
		-0.831	-0.959	0.108	-0.059	0.071	0.002	0.534	0.343
Department Dummy	ld_a3_2	-0.513	-0.500	-0.780	-0.768	-0.889	-0.884	-0.906	-0.904
(Santa Ana)		-0.942	-0.897	-1.999	-1.944	-1.206	-1.190	-1.966	-1.940
Department Dummy	ld_a3_3	-0.412	-0.554	-1.036	-1.117	-0.580	-0.644	-0.946	-1.023
(Sonsonate)		-0.762	-0.989	-2.793	-2.937	-0.748	-0.791	-2.018	-2.108
Department Dummy	ld_a3_4	-1.298	-1.295	-1.380	-1.368				
(Chalatenango)		-2.192	-2.171	-3.537	-3.512				
Department Dummy	ld_a3_5	-1.203	-1.251	-0.991	-1.020	-1.379	-1.381	-0.953	-0.967
(La Libertad)		-2.341	-2.396	-2.735	-2.795	-1.915	-1.897	-2.169	-2.173
Department Dummy	ld_a3_6	-0.636	-0.659	-0.738	-0.732	-0.648	-0.582	-0.822	-0.763
(San Salvador)		-1.175	-1.184	-1.905	-1.852	-0.892	-0.789	-1.781	-1.614
Department Dummy	ld_a3_7	-1.274	-1.312	-1.522	-1.519	-1.146	-0.903	-1.288	-1.144
(Cuscat Land)		-2.000	-2.031	-3.453	-3.437	-1.294	-0.977	-2.441	-2.078
Department Dummy	ld_a3_8	-1.337	-1.386	-0.869	-0.905	-1.424	-1.449	-0.805	-0.834
(La Paz)		-2.307	-2.327	-2.219	-2.267	-1.809	-1.792	-1.738	-1.752
Department Dummy	ld_a3_9	-1.394	-1.359	-1.142	-1.130	-1.750	-1.776	-1.099	-1.133
(Cabanas)		-2.144	-2.060	-2.531	-2.488	-2.017	-2.017	-2.036	-2.049
Department Dummy	d_a3_10	-1.940	-2.037	-1.611	-1.672	-1.953	-2.001	-1.351	-1.404
(San Vincente)		-3.180	-3.352	-3.814	-3.967	-2.408	-2.465	-2.635	-2.766
Department Dummy	d_a3_11	-1.823	-1.963	-1.539	-1.617	-2.262	-2.274	-1.969	-1.981
(Usulutan)		-3.396	-3.601	-4.194	-4.352	-2.807	-2.807	-4.271	-4.283
Department Dummy	d_a3_12	-1.029	-1.057	-0.870	-0.866	-1.244	-1.181	-0.952	-0.919
(San Miguel)		-1.824	-1.851	-2.311	-2.284	-1.583	-1.477	-2.170	-2.042
Department Dummy	d_a3_13	-1.583	-1.675	-1.578	-1.611	-1.755	-1.644	-1.408	-1.309
(Morazan)		-2.823	-2.929	-4.117	-4.130	-1.993	-1.807	-2.476	-2.215
Department Dummy	d_a3_14	-1.244	-1.291	-1.438	-1.468	-1.758	-1.788	-1.518	-1.558
(La Union)		-2.280	-2.337	-3.779	-3.813	-2.365	-2.367	-3.398	-3.424
Inverse Mills Ratio	i_mills	-1.091	-1.089	-0.455	-0.426	-0.739	-0.629	-0.377	-0.290
		-1.932	-1.786	-1.151	-1.035	-1.689	-1.362	-1.302	-0.928
	N	897	897	897	897	565	565	565	565
	R^2	0.109	0.110	0.083	0.086	0.149	0.152	0.112	0.116
EDUCO effect (unconditional)		**-1.794**		**-0.860**		**-0.911**		**-0.532**	
EDUCO effect (conditional)		**-0.125**		**-0.16**		**0.02**		**-0.057**	

Table 7. OLS (Robust Standard Error) Regression
Dependent Variable: Days of Teacher's Absence

Sample		Whole				Pure			
Specification		1	1y	2	2y	1	1y	2	2y
variables	code	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
		t	t	t	t	t	t	t	t
Constant	_cons	2.008	1.758	3.082	2.967	2.458	2.308	2.229	2.238
		3.190	2.602	3.664	3.465	3.322	3.006	2.088	2.069
=1 if EDUCO	e_w	-0.377		-0.265		-0.546		-0.231	
		-1.941		-1.225		-2.200		-0.928	
=1 if EDUCO built in 91-94	ed91_94		0.087		0.128		-0.215		-0.129
			0.287		0.389		-0.644		-0.383
=1 if EDUCO built in 95	ed95		-0.793		-0.474		-0.974		-0.326
			-1.990		-1.139		-2.057		-0.620
=1 if EDUCO build in 96	ed96		-0.653		-0.617		-0.655		-0.207
			-2.483		-2.044		-2.440		-0.705
=1 if year missing	ed_miss		-0.127		-0.111		-0.793		-0.504
			-0.302		-0.257		-2.125		-1.178
=1 if mixed traditional	trad_m		0.103		0.082		(droppe		(droppe
			0.546		0.457		d)		d)
Gender (female=1)	a_d_1d	0.042	0.061	0.045	0.062	-0.065	-0.056	-0.049	-0.051
		0.295	0.430	0.316	0.441	-0.372	-0.319	-0.280	-0.291
Live without parent(s)=1	a_c_1d2	0.262	0.236	0.259	0.238	0.439	0.429	0.393	0.397
		0.872	0.782	0.900	0.823	1.244	1.218	1.184	1.187
Mother enter basic education=1	edl_m	0.157	0.151	0.196	0.189	0.342	0.346	0.375	0.376
		0.990	0.944	1.230	1.172	1.946	1.955	2.158	2.112
Mother's education missing=1	ed_mm	-0.166	-0.181	-0.118	-0.128	-0.005	-0.006	0.043	0.048
		-0.749	-0.827	-0.540	-0.590	-0.016	-0.021	0.155	0.170
Father enter basic education=1	edl_p	-0.142	-0.159	-0.156	-0.172	0.092	0.074	0.078	0.073
		-0.969	-1.084	-1.065	-1.167	0.523	0.417	0.426	0.394
Father's education missing=1	ed_pm	0.015	0.015	0.018	0.009	-0.473	-0.477	-0.553	-0.564
		0.041	0.041	0.049	0.026	-1.372	-1.371	-1.615	-1.636
Number of siblings (age of 4-15)	pa_b3	0.011	0.010	0.001	0.001	-0.072	-0.074	-0.059	-0.059
		0.195	0.182	0.022	0.027	-1.283	-1.315	-1.044	-1.032
Own house=1	pa_e1d	0.109	0.112	0.082	0.082	0.147	0.144	0.107	0.099
		0.734	0.751	0.556	0.554	0.919	0.884	0.684	0.615
Electricity available=1	pa_e81d	-0.501	-0.489	-0.455	-0.438	-0.427	-0.448	-0.626	-0.634
		-2.663	-2.578	-2.131	-2.039	-1.722	-1.808	-2.224	-2.227
Sanitary service available=1	pa_e82d	0.294	0.316	0.317	0.334	0.339	0.376	0.396	0.402
		1.452	1.548	1.572	1.638	1.401	1.535	1.621	1.624
Water available=1	pa_e85d	0.030	0.016	0.152	0.153	-0.100	-0.121	-0.075	-0.074
		0.104	0.054	0.507	0.507	-0.366	-0.433	-0.248	-0.243
Child's age	childage	-0.037	-0.030	-0.039	-0.037	-0.066	-0.058	-0.060	-0.062
		-0.774	-0.613	-0.833	-0.782	-1.305	-1.113	-1.118	-1.123
Teaher-pupil ratio (school level)	d_p_all			1.590	0.958			1.903	1.758
				1.241	0.708			1.235	1.073
Sanitation/latrine available at shool	d_d11d			-0.407	-0.394			-0.332	-0.348
				-1.257	-1.223			-0.647	-0.681
Electricity available at school	d_d12d			0.093	0.066			0.505	0.514
				0.441	0.318			1.817	1.803
Piped water available at school	d_d21d			-0.243	-0.224			-0.386	-0.356
				-1.485	-1.345			-1.698	-1.480
=1 if teacher finish university	predu_un			-0.176	-0.193			0.054	0.047
				-1.105	-1.212			0.277	0.247
year of teachers experience	pr_year			-0.016	-0.016			-0.004	-0.006
				-1.379	-1.432			-0.251	-0.359
Monthly base salary of teacher	pr_c2			0.000	0.000			0.000	0.000
				-0.924	-0.890			-0.083	-0.042
If teacher receive bonus=1	pr_bonu			0.220	0.206			0.426	0.411
				1.470	1.364			2.305	2.169
If all students have math textbook=1	pr_math			0.512	0.472			-0.134	-0.118
				1.648	1.535			-0.462	-0.396
All students have language textbook	pr_lang			-0.532	-0.555			0.137	0.090
				-1.588	-1.649			0.416	0.256
=1 if teach in multigrade class	pr_d15d			0.108	0.107			-0.524	-0.527
				0.522	0.519			-2.271	-2.243
# of ACE/SpDF's visits to classroom	pr_d11			-0.039	-0.034			-0.053	-0.053
				-2.791	-2.555			-3.209	-3.055
Teacher's meeting with parents	pr_f123			-0.024	-0.025			-0.024	-0.020
				-0.774	-0.783			-0.584	-0.465

BEST COPY AVAILABLE

Sample		Whole				Pure			
Specification		1	1y	2	2y	1	1y	2	2y
variables	code	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
		t	t	t	t	t	t	t	t
Department Dummy	ld_a3_2	-0.907	-0.713	-1.054	-0.882	-1.107	-1.014	-0.737	-0.715
(Santa Ana)		-3.268	-2.466	-3.562	-2.909	-2.953	-2.746	-1.812	-1.750
Department Dummy	ld_a3_3	-0.148	0.042	-0.415	-0.235	-0.077	0.100	-0.068	0.001
(Sonsonate)		-0.497	0.139	-1.296	-0.707	-0.189	0.243	-0.153	0.002
Department Dummy	ld_a3_4	-0.208	-0.092	-0.612	-0.510				
(Chalatenango)		-0.528	-0.234	-1.475	-1.243				
Department Dummy	ld_a3_5	-0.188	-0.112	-0.253	-0.179	-0.164	-0.129	0.197	0.223
(La Libertad)		-0.570	-0.340	-0.627	-0.447	-0.379	-0.307	0.352	0.402
Department Dummy	ld_a3_6	-0.684	-0.507	-0.669	-0.497	-1.065	-0.969	-0.686	-0.656
(San Salvador)		-2.405	-1.745	-2.049	-1.488	-2.821	-2.600	-1.553	-1.471
Department Dummy	ld_a3_7	0.003	0.031	0.037	0.070	-0.469	-0.405	-0.031	0.060
(Cuscat Land)		0.008	0.076	0.071	0.133	-0.972	-0.845	-0.054	0.100
Department Dummy	ld_a3_8	0.528	0.757	0.530	0.695	0.500	0.684	0.944	0.988
(La Paz)		1.102	1.528	1.035	1.349	0.816	1.075	1.365	1.406
Department Dummy	ld_a3_9	-0.386	-0.280	-0.456	-0.363	-0.510	-0.478	-0.118	-0.092
(Cabanas)		-1.028	-0.745	-1.145	-0.917	-1.014	-0.966	-0.234	-0.183
Department Dummy	d_a3_10	-0.135	-0.020	-0.082	-0.001	0.311	0.397	0.969	0.993
(San Vincente)		-0.280	-0.043	-0.159	-0.001	0.445	0.581	1.349	1.424
Department Dummy	d_a3_11	0.239	0.325	0.027	0.108	0.320	0.298	0.543	0.549
(Usulutan)		0.708	0.970	0.071	0.285	0.633	0.597	0.920	0.934
Department Dummy	d_a3_12	0.603	0.752	0.466	0.611	-0.353	-0.235	-0.039	0.019
(San Miguel)		1.492	1.853	1.146	1.496	-0.846	-0.564	-0.089	0.041
Department Dummy	d_a3_13	0.857	0.988	0.640	0.790	0.401	0.486	0.816	0.854
(Morazan)		1.766	2.007	1.338	1.623	0.538	0.641	1.129	1.192
Department Dummy	d_a3_14	-0.038	0.093	-0.171	-0.057	-0.076	0.002	0.237	0.270
(La Union)		-0.103	0.251	-0.431	-0.146	-0.157	0.003	0.468	0.531
Inverse Mills Ratio	i_mills								
	N	896	896	896	896	564	564	564	564
	R^2	0.0751	0.080	0.100	0.103	0.088	0.092	0.130	0.131
EDUCO effect (Unconditional)		**-0.377**		**-0.265**		**-0.546**		**-0.231**	

Table 8. OLS (Robust Standard Error) Pooled Regression with Self-selection
Dependent Variable: Days of Teacher's Absence

Sample									
Specification		1-s	1y-s	2-s	2y-s	1-s	1y-s	2-s	2y-s
variables	code	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
		t	t	t	t	t	t	t	t
Constant	_cons	2.139	2.072	3.288	3.336	2.737	2.617	2.502	2.493
		3.181	3.024	3.875	3.936	3.645	3.401	2.357	2.331
=1 if EDUCO		-0.772		-0.863		-1.391		-1.274	
		-1.030		-1.123		-2.825		-2.626	
=1 if EDUCO built in 91-94	ed91_94		-0.939		-0.960		-1.262		-1.265
			-1.261		-1.247		-2.467		-2.585
=1 if EDUCO built in 95	ed95		-2.012		-1.780		-2.382		-1.951
			-2.218		-1.876		-3.594		-2.756
=1 if EDUCO build in 96	ed96		-1.806		-1.837		-1.922		-1.571
			-2.161		-2.077		-3.998		-2.984
=1 if year missing	ed_miss		-1.207		-1.243		-1.901		-1.655
			-1.391		-1.410		-3.580		-2.855
=1 if mixed traditional	trad_m		0.153		0.135		(droppe		(dropp
			0.779		0.728		d)		ed)
Gender (female=1)	a_d_1d	0.034	0.042	0.033	0.043	-0.088	-0.080	-0.077	-0.078
		0.235	0.293	0.224	0.297	-0.493	-0.452	-0.437	-0.441
Live without parent(s)=1	a_c_1d2	0.292	0.319	0.304	0.324	0.519	0.534	0.481	0.497
		0.958	1.055	1.044	1.118	1.464	1.515	1.440	1.493
Mother enter basic education=1	edl_m	0.165	0.171	0.209	0.209	0.370	0.384	0.404	0.400
		1.015	1.054	1.273	1.276	2.079	2.153	2.285	2.234
Mother's education missing=1	ed_mm	-0.178	-0.220	-0.135	-0.171	-0.055	-0.085	-0.001	-0.033
		-0.787	-0.986	-0.605	-0.770	-0.189	-0.297	-0.002	-0.117
Father enter basic education=1	edl_p	-0.154	-0.198	-0.175	-0.213	0.107	0.085	0.092	0.083
		-1.042	-1.334	-1.185	-1.435	0.608	0.486	0.505	0.451
Father's education missing=1	ed_pm	0.001	-0.023	-0.003	-0.027	-0.513	-0.527	-0.611	-0.619
		0.001	-0.061	-0.008	-0.075	-1.495	-1.519	-1.788	-1.796
Number of siblings (age of 4-15)	pa_b3	0.013	0.017	0.005	0.009	-0.069	-0.071	-0.054	-0.053
		0.242	0.305	0.096	0.166	-1.238	-1.269	-0.963	-0.932
Own house=1	pa_e1d	0.096	0.077	0.062	0.044	0.096	0.077	0.047	0.039
		0.641	0.516	0.417	0.297	0.571	0.459	0.294	0.241
Electricity available=1	pa_e81d	-0.566	-0.670	-0.545	-0.616	-0.599	-0.695	-0.801	-0.845
		-2.381	-2.864	-2.148	-2.470	-2.263	-2.667	-2.707	-2.890
Sanitary service available=1	pa_e82d	0.258	0.220	0.262	0.230	0.268	0.294	0.316	0.324
		1.214	1.032	1.227	1.078	1.117	1.221	1.282	1.315
Water available=1	pa_e85d	0.001	-0.066	0.105	0.064	-0.160	-0.218	-0.167	-0.191
		0.005	-0.231	0.353	0.214	-0.571	-0.756	-0.537	-0.603
Child's age	childage	-0.035	-0.024	-0.037	-0.032	-0.059	-0.043	-0.051	-0.047
		-0.744	-0.493	-0.785	-0.661	-1.173	-0.833	-0.952	-0.854
Teaner-pupil ratio (school level)	d_p_all			1.762	1.154			2.511	2.174
				1.356	0.853			1.643	1.351
Sanitation/latrine available at shool	d_d11d			-0.427	-0.439			-0.472	-0.530
				-1.324	-1.374			-0.932	-1.067
Electricity available at school	d_d12d			0.086	0.051			0.474	0.451
				0.402	0.241			1.704	1.564
Piped water available at school	d_d21d			-0.244	-0.223			-0.391	-0.320
				-1.498	-1.344			-1.728	-1.309
=1 if teacher finish university	predu_un			-0.176	-0.202			0.072	0.043
				-1.106	-1.254			0.377	0.224
year of teachers experience	pr_year			-0.016	-0.017			-0.005	-0.009
				-1.377	-1.446			-0.317	-0.498
Monthly base salary of teacher	pr_c2			0.000	0.000			0.000	0.000
				-0.909	-0.856			0.182	0.340
If teacher receive bonus=1	pr_bonu			0.222	0.205			0.465	0.468
				1.481	1.353			2.542	2.492
If all students have math textbook=1	pr_math			0.506	0.447			-0.172	-0.210
				1.618	1.445			-0.597	-0.709
All students have language textbook	pr_lang			-0.530	-0.557			0.152	0.116
				-1.576	-1.645			0.462	0.329
=1 if teach in multigrade class	pr_d15d			0.118	0.119			-0.495	-0.498
				0.565	0.576			-2.123	-2.087
# of ACE/SpDF's visits to classroom	pr_d11			-0.039	-0.033			-0.052	-0.045
				-2.818	-2.453			-3.116	-2.702
Teacher's meeting with parents	pr_f123			-0.024	-0.024			-0.019	-0.010
				-0.759	-0.741			-0.452	-0.226

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Sample									
Specification		1-s	1y-s	2-s	2y-s	1-s	1y-s	2-s	2y-s
variables	code	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
		t	t	t	t	t	t	t	t
Department Dummy	ld_a3_2	-0.945	-0.780	-1.110	-0.945	-1.198	-1.101	-0.857	-0.806
(Santa Ana)		-3.370	-2.708	-3.726	-3.131	-3.185	-2.967	-2.069	-1.948
Department Dummy	ld_a3_3	-0.169	0.016	-0.449	-0.253	-0.120	0.114	-0.123	0.085
(Sonsonate)		-0.568	0.054	-1.404	-0.765	-0.293	0.279	-0.277	0.178
Department Dummy	ld_a3_4	-0.235	-0.144	-0.654	-0.567				
(Chalatenango)		-0.597	-0.372	-1.580	-1.392				
Department Dummy	ld_a3_5	-0.203	-0.141	-0.273	-0.197	-0.157	-0.108	0.219	0.285
(La Libertad)		-0.613	-0.424	-0.674	-0.491	-0.362	-0.257	0.389	0.513
Department Dummy	ld_a3_6	-0.701	-0.522	-0.699	-0.518	-1.155	-1.052	-0.836	-0.783
(San Salvador)		-2.466	-1.805	-2.144	-1.558	-3.024	-2.785	-1.863	-1.739
Department Dummy	ld_a3_7	-0.028	-0.059	-0.013	-0.032	-0.544	-0.530	-0.075	-0.030
(Cuscat Land)		-0.067	-0.144	-0.025	-0.061	-1.113	-1.106	-0.129	-0.051
Department Dummy	ld_a3_8	0.505	0.742	0.496	0.680	0.453	0.705	0.857	0.988
(La Paz)		1.063	1.510	0.975	1.326	0.745	1.113	1.238	1.407
Department Dummy	ld_a3_9	-0.389	-0.265	-0.461	-0.340	-0.342	-0.228	0.077	0.175
(Cabanas)		-1.035	-0.703	-1.156	-0.860	-0.658	-0.445	0.149	0.339
Department Dummy	d_a3_10	-0.144	-0.025	-0.092	0.003	0.335	0.474	1.004	1.089
(San Vincente)		-0.300	-0.054	-0.178	0.005	0.482	0.694	1.391	1.541
Department Dummy	d_a3_11	0.222	0.288	-0.001	0.069	0.299	0.258	0.477	0.493
(Usulutan)		0.655	0.854	-0.003	0.182	0.587	0.515	0.810	0.842
Department Dummy	d_a3_12	0.593	0.753	0.452	0.615	-0.361	-0.210	-0.040	0.078
(San Miguel)		1.466	1.854	1.112	1.511	-0.865	-0.501	-0.090	0.169
Department Dummy	d_a3_13	0.864	1.024	0.642	0.822	0.531	0.708	0.898	0.987
(Morazan)		1.782	2.092	1.344	1.696	0.737	0.970	1.261	1.405
Department Dummy	d_a3_14	-0.057	0.067	-0.197	-0.078	-0.094	0.009	0.201	0.291
(La Union)		-0.154	0.182	-0.505	-0.199	-0.195	0.018	0.399	0.567
Inverse Mills Ratio	i_mills	-0.239	-0.685	-0.359	-0.717	-0.595	-0.835	-0.693	-0.846
		-0.554	-1.453	-0.826	-1.501	-1.810	-2.514	-2.307	-2.751
	N	896	896	896	896	564	564	564	564
	R^2	0.08	0.083	0.100	0.105	0.093	0.101	0.136	0.139
EDUCO effect (Unconditional)		**-0.772**		**-0.863**		**-1.391**		**-1.274**	
EDUCO effect (conditional)		**-0.406**		**-0.314**		**-0.641**		**-0.400**	

Annex:
Geographical Distribution of Schools

Sample		Whole			Pure		
School Type		All	EDUCO	Trad		EDUCO	Trad
Department Dummy (Santa Ana)	Id_a3_2	0.09	0.06	0.10	0.13	0.04	0.16
Department Dummy (Sonsonate)	Id_a3_3	0.08	0.16	0.06	0.08	0.18	0.05
Department Dummy (Chalatenango)	Id_a3_4	0.06	0.03	0.07	0.00		
Department Dummy (La Libertad)	Id_a3_5	0.12	0.18	0.11	0.15	0.24	0.12
Department Dummy (San Salvador)	Id_a3_6	0.10	0.06	0.11	0.12	0.04	0.14
Department Dummy (Cuscat Land)	Id_a3_7	0.04	0.06	0.03	0.03	0.07	0.02
Department Dummy (La Paz)	Id_a3_8	0.06	0.06	0.06	0.08	0.07	0.08
Department Dummy (Cabanas)	Id_a3_9	0.04	0.02	0.04	0.05	0.03	0.06
Department Dummy (San Vincente)	Id_a3_10	0.04	0.05	0.04	0.04	0.07	0.03
Department Dummy (Usulutan)	Id_a3_11	0.09	0.08	0.09	0.06	0.07	0.06
Department Dummy (San Miguel)	Id_a3_12	0.10	0.11	0.09	0.10	0.07	0.10
Department Dummy (Morazan)	Id_a3_13	0.06	0.02	0.07	0.04	0.03	0.04
Department Dummy (La Union)	Id_a3_14	0.08	0.04	0.09	0.10	0.06	0.11

Note: There are no pure EDUCO schools at Department Chalatenango

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